14 JULY 1995 - 11 AM

Bob Cooper's

JULY 15 1995

SatFACTS MONTHLY

Reporting on "The World" of satellite television in the Pacific Ocean Region

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Preparing For the BIG One's Arrival !

Spectrum Analysers: What They Do and Why You May Need One

MORE: Cable TV Planning / Satellite For Motels; plus: Guideline to Fortuitous Reception

✓ Latest programmer news
✓ Latest hardware news
✓ Latest SPACE Pacific activities
✓ and new booklet to help dealers sell dishes!

Vol. 1 ◆ No. 11
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SPECTRUM ANALYSERS: DO YOU NEED ONE?

SatFACTS

MONTHLY

SatFACTS Monthly is published 12 times each year (on or about 15th of each month) by Far North Cablevision, Ltd.

This publication is dedicated to the premise that as we enter the 21st century, ancient 20th century notions concerning borders and boundaries no longer define a person's horizon. In the air, all around you, are microwave signals carrying messages of entertainment, information and education. These messages are available to anyone willing to install the appropriate receiving equipment and, where applicable, pay a monthly or annual fee to receive the content of the messages in the privacy of their own home. Welcome to the 21st century - a world without borders, a world without boundaries.

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ERRATA

COOP'S COMMENT

July 15, 1995

A report appearing in our June 30th edition of "Coop's Technology Digest" requires clarification. It appeared on pages 8, 9 and 10 and the title alone drew heaps of protest (**"BABY-BLUE Movies Via Satellite"**). Baby-Blue is a soft way of saying (possibly) pornographic.

Of the several dozen calls and faxes I received after this report appeared, I consider that from Andrew Jordan of PanAmSat the most concerning. And with good foundation.

Our June 30th report quoted an earlier (May 31) report also in CTD suggesting that a firm planning 'blue' movies was talking with PanAmSat concerning Ku-band transponder space to reach viewers in New Zealand and Australia. Jordan asked that I set the record straight:

Number one: PanAmSat has a policy that they will **never** allow any 'pornogaphic' programming on any of their satellites.

Number two: Should a programmer attempt to 'sneak' such programming on board one of their satellites, they spell out very clearly in their contract that such programming is forbidden.

To that PanAmSat's Becky French adds, "The entire foundation of PanAmSat from the start of the company has been that we will **never** deal with pornographic programmers." Both French and Jordan insist they have never had contact with a possible client with pornograhic plans.

Fair enough.

But as CTD reported, the trio of business firms behind this proposed service are fully aware that a movie that is rated 'X' might have a difficult time with government authorities in New Zealand and Australia. What they seek is a new classification for adult movies perhaps to be called 'Non Violent Erotic' (NVE for short). By avoiding obvious taboo subjects (bestiality, or, the exploitation of children, for example) and by only selecting films based upon 'clean, wholesome romps in the hay' the people behind "The Spice Club" will stay out of the 'X' (to triple-X) and 'hard R' ratings world.

Becky French is not so certain movie ratings are a fair measure of a film's acceptability. In the United States, the Supreme Court has been divided on how someone in authority determines that fine line betwen 'art' and pornography. "If the (US) rating system changes and movies presently 'X' become some new rating while the content remains the same, what then?" she ponders. Jordan adds "We all know pornography when we see it."

Perhaps. But can we agree on what is, and, what is not prnographic? If the rating system is suspect and subject to manipulation, does that mean that each individual person must then form their own determination of pornography? Can "The Spice Club" strike a new balance by eliminating violence, human and animal exploitation and thereby avoid censorship by people who will "know pornography when they see it?"

Curious about how a satellite operator other than PanAmSat might deal with this issue, we asked Rimsat if they have a policy in this area. Surprise: They do. And it is that their programmers agree in contract not to show 'X' rated material. Does that mean that everyone who might see a non-X-rated film carried by a Rimsat programmer would agree that the film is not pornographic? Not likely. And so the debate is on; stay tuned.

In Volume 1 ◆ Number 11

Departments

-ON THE COVER-

Spectrum Analysers: They start at 5 grand and go up. Can you install, service, and trouble shoot satellite-direct or SMATV / CATV systems without one? An analysis starts in this issue (p.9).

MEET CYNTHIA DICKINS

To many in the Pacific and Asia, Cynthia Dickins is PanAmSat, providing carefully thought out consultation and guidance from the region's leading provider of C and Ku band satellite interconnections. Her technical and operational guidance has assisted dozens of new and established satellite programme providers to better understand their options, grasp their own potentials, reach their intended markets. If you want this sort of practical experience and help, chat with Cynthia and the other professionals at ...

SPACE Pacific's
South Pacific Region
Satellite & Cable Show
January 23 - 27
Auckland

Invitations to SPACE members 1 August; all others 15 September

PROGRAMMER PROGRAMMING PROMOTION UPDATE

JULY 15, 1995

TELEVISION CORPORATION of SINGAPORE (TCS) will appear on PAS-2 in Scientific Atlanta MPEG format with ambitious plans to distribute 18 hours per day of Mandarin language programming throughout Asia and the Pacific. TCS programming will include drama, telemovies, documentaries, variety, current affairs and magazine programmes. Expansion to 24 hours is planned. The service is to be available to cable, SMATV and DTH (homes) on subscription; no pricing details yet. Contact Christina Leong (tel: 65-350-3371; fax 65-253-8119).

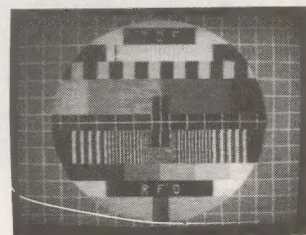
TCS TELEVISION CORPORATION OF SINGAPORE

Orient Satellite Communications Inc. has leased PAS-2 China Beam transponder 4V for transmission of NTSC analogue Mandarin language programming to Asia proper; the first Taiwanese and full-time Ku band customer for PAS-2. They plan conversion to MPEG with 5 separate video programmes (+ a number of audio-only radio channels) at some future date. See 'With The Observers' this issue.

PanAmSat is scheduled to launch PAS-4 (going to above the Indian Ocean for service to Asia, Africa) August 1st (2nd west of the dateline). In the past PanAmSat has carried 'live coverage' of their launches on all of their satellites; look for this in clear analogue on PAS-2 and keep your fingers crossed (PAS-3 came down in flames before horrified viewers last December).

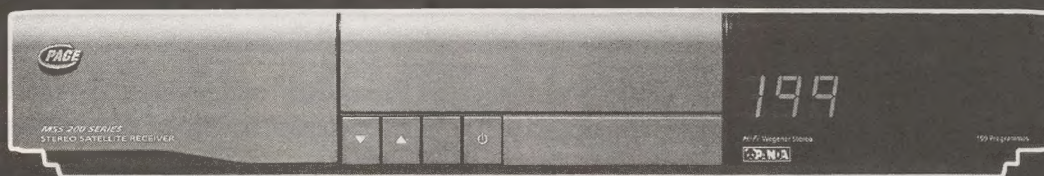
PanAmSat

Non Violent Erotic (NVE) 'Adult' programming for subscribing viewers in portions of the South Pacific is planned by consortium of 3 companies with extensive experience in marketing adult videos. "The SPICE Club" hopes to be on Ku-band (1-2m size dishes for areas reached) using encrypted analogue format by year end.

RFO on I180 (TR18; IF 1105) reverted to test pattern from Papeete for several days late in June; staff was on strike to protest French resumption of nuclear testing in islands. Evening newscast (typically 0600 UTC) offers extra insight into French problems with Tahiti.

Galaxy will use jointly developed PACE/Irdeto encoding system, not Videocrypt (Videoguard) encryption of News Data Comm (SF10, p.21) as previously reported. A spokesman for Galaxy advises SF "Galaxy does not have any intention of expanding outside of Australia at this time; (we) furthermore have an obligation to ensure there is no piracy outside of Australia" (read: New Zealand).

Deutsche Welle is advising viewers that DVB Compliant MPEG receivers for their new AsiaSat 2 service will be available from Pace, Scientific Atlanta, Nokia and Philips; the first indication that suppliers other than Pace will have units for this service. DW says, "Following a 3 month test period of the satellite, transmissions will begin in MPEG," and they cite a November start date for programming on AS2.

AsiaSat Corporate Affairs Manager Winnie Pang advises us (on July 7) "We are anticipating a 3rd quarter launch, most probably in September (for AS2)." Another source advises, "It is currently doing vibration tests having passed thermal vacuum check out. Expect launch in early October." We still may not have a definitive launch date but at least the estimates by sources are falling closer and closer together!

EASY ACCESS,

MAXIMUM CHOICE

Pace satellite receivers give you an unrivalled combination of performance and value for money - it's what you would expect from the world's leading satellite TV systems manufacturer.

And now all our receivers feature Super DTX - Dynamic Threshold Control circuitry which improves satellite reception in areas where the signal is weak. It's what you need whether you're enjoying life in the Outback or your signal has gone walkabout in the Bush.

The Pace MSS200 is a 199 programme receiver built around Pace's super wide Ku/C band switchable tuner giving superb reception of your favourite channels from around the world. Channels like *NHK, Deutsche Welle, EMTV, Star Plus, Chinese Channel and Zee TV.*

And, like all receivers in the world's best range of satellite systems, the Pace MSS200 features original Wegener Panda 1 stereo and digital sound processing.

For the viewer who wants extra channels, the Pace MSS500 is a high performance system. Featuring a dish positioner module, the 250 programme receiver supports dual LNB inputs giving significant expansion potential for multi-satellite viewing.

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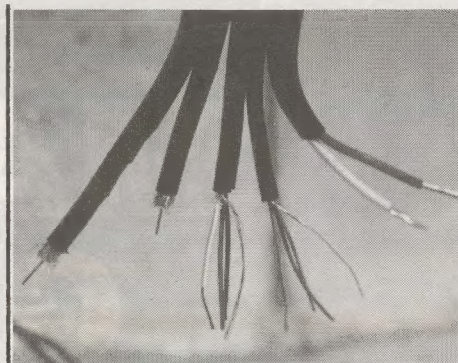
HARDWARE EQUIPMENT PARTS UPDATE

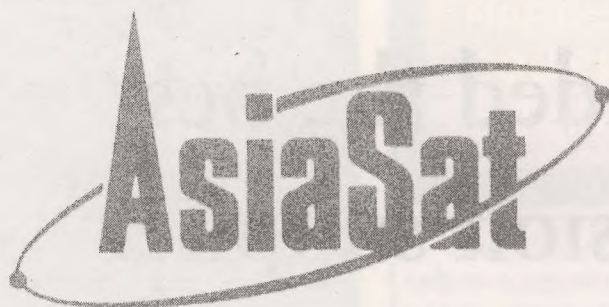
JULY 15, 1995

Flat ribbon-configured 'Quad-Plus' cable simplifies installation of dish systems equipped with polarisation rotation and motor driven actuator. Left to right in photo: Two identical RG6/U cables (typically used 1-each for C and Ku), (3rd from left) shielded polarotor 3-wire cable, (4th from left) shielded sensor wires for dish actuator control system and on far right, sizeable twin wires to carry DC voltage from receiver or dish controller to actuator motor. All are colour coded. Pricing typically compares with having 5 individual dedicated wire-sets but has advantage of being run all at same time and laying flat together in burial or conduit. Ask your distributor.

Scientific Atlanta model 9708 NTSC B-MAC IRD required for TNT (and MTV Mandarin) will NOT accept "Compression (digital) Module" after all (SF#10, p.17). Although manual with receiver clearly provides instructions for tuning receiver with "optional CDV module" installed (p.4-2, 4-4, 4-8), SA advised users mid-June this module project "has been cancelled" by SA. Unfortunately, this puts users hoping to have single piece analogue and digital compatible receiver (albeit at US$1300 a copy) back to square one.

Latest "hot receiver" is PALCOM SL-7900RP from Japan but imported into Australia by AV-COMM Pty Ltd and New Zealand by Bay Satellite Ltd. Unit tested by SatFACTS did best job we have seen on signals 2 to 3dB below threshold. Features include stair-step remote controlled TED (threshold extension) with 32 separate viewer selected extension positions; a remarkable range of below threshold signal tweeking capabilities. IF range is 950-2050 MHz with dual LNB inputs and built-in antenna positioner. Audio is excellent but design unfortunately limits audio bandwidths to two positions: 150 and 280 kHz.

Pace DVB Compliant MPEG receiver, required for AsiaSat 2, is being quoted at US$450 per copy "plus $50 conditional access fee" by one Hong Kong supplier. Actual delivery of units may not have started although samples are being shown in Asia. The Conditional Access fee is part of the software authorisation routine service and in this instance applied to dealer seeking to obtain authorisation for reception from Deutsche Welle service (see p.2 here); other services may have different fees .

Attention suppliers: Material for consideration in this section of SatFACTS should be addressed to SatFACTS, PO Box 330, Mangonui, Far North, New Zealand. Details should include pricing in US dollars, sources, and availability of products or services.

When The Bird Flies:

AsiaSat 2 WILL PIONEER SEVERAL NEW TECHNOLOGIES

All of your Christmases At One:

For more than a decade (south) Pacific region residents have been forced to endure the weak signal levels and unstable operation of Intelsat satellites intended originally to serve 13 metre and larger dish installations. That any usable reception on dishes in the 3 metre class has resulted is a tribute to the creativity of those who have accepted this challenge.

With the launch of AsiaSat 2 many portions of the Pacific will, for the first time, have access to satellite signals designed on purpose to serve dishes 3 metres in size and smaller. This has been a long time in arriving and the launch of this new high powered C-band satellite is but the first step in a series of new satellites with similar capabilities. An entirely new industry is about to explode into the Pacific region.

Spot vs. Regional Coverage Beams:

Geostationary satellites residing above the equator at an altitude of 36,000 kilometres are capable of 'seeing' (transmitting signals to) 42% of the earth's surface. For most uses and users there is no financial return to serving large ocean areas with few or no inhabitants. The alternative to transmitting in a global beam pattern is to create a more concentrated signal coverage zone which approximates the land area masses where there are potential users of a service (see SF#10, p.'s 2-6). These (smaller) coverage areas are known as 'spot beams'. The technology to create transmit antenna patterns of either a global (wide area) or spot (limited area coverage) has been with us from the first satellites. What was less developed was the ability to sculpture or create a signal coverage contour which more precisely replicated the outline of a specific target area; Australia as a continent, for example. The launch of AsiaSat 2 marks a new era in shaped coverage for a C-band satellite by creating a pattern which purposefully follows the natural breaks in land masses and population centres. In other words, by confining the limited transmission power available to that segment of the earth's surface where there will be direct benefits, AsiaSat has created a new, more efficient satellite system.

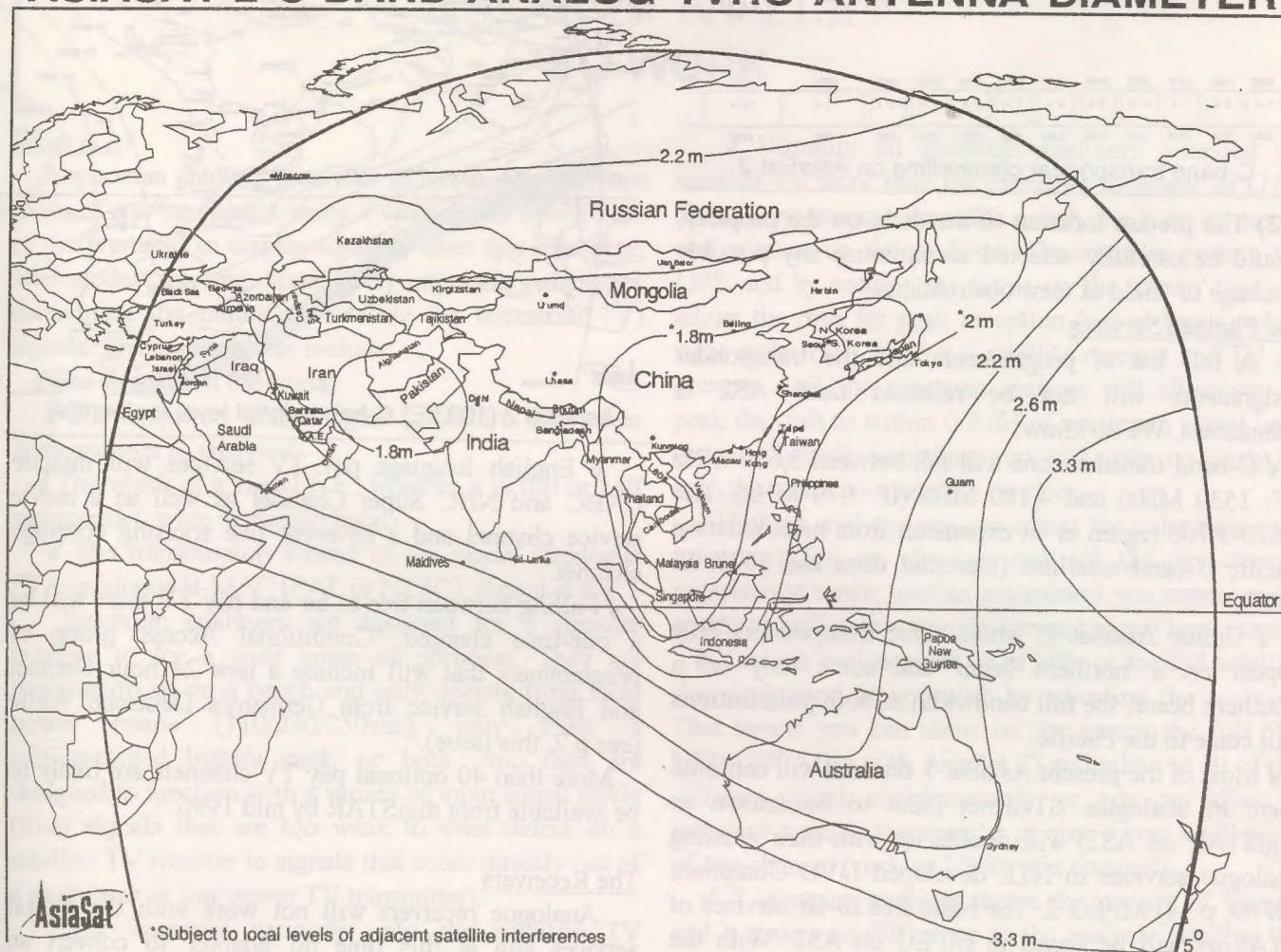
Simultaneous to the technology that now allows specially shaped C-band coverage patterns comes the wonderful, largely unknown world of MPEG compressed digital video. Quite beyond the control or direction of AsiaSat (the satellite operator) are individual plans for use of this satellite by programmers such as Rupert Murdoch's STARnet service (to be renamed digiSTAR in its digital format) and Deutsche Welles multi-language programming. Out of all of this change comes a measure of chaos (Oxford: "utter confusion") guaranteed to add uncertainty to our business (and private) lives for at least the next 12 months.

Bad News: Coverage? Yes and No

In the coverage map shown here, AsiaSat 2 is forecasting the size of receiving dish required for satellite terminals located within its 'footprint' (coverage) area. There is a key word in the text at the top of the map: Analog(ue). As SF#7 (p.11) clearly displayed in photographs, an analogue signal with a carrier to noise ratio (C/NR) of 7dB is with most quality receivers right on the edge of degradation ("sparklies" in the trade). At that same point a digital signal is strong and clear. At a 5.5 dB C/NR the analogue picture has objectionable sparklies and the picture "tears" along vertical image edge lines whereas the digital picture is still "digi-perfect." In most situations a digital picture will appear perfect when the C/NR is from 2 to 3dB lower than the level that produces a similar perfect picture with analogue. And this directly impacts the size of the dish required. The AsiaSat 2 map is for analogue services.

To be sure, not all users of AsiaSat 2 will employ compressed digital video. But for the vast majority of the programmers seeking to provide programmes to the (south Pacific), digital will be the name of the game. Notice that the forecast dish size for Sydney is 2.6m(etres). For a digital signal, that becomes a 2.1 to 2.3 metre dish. With this warning: When an analogue signal drops below threshold, the picture degrades with noise ("sparklie bits") while when a digital signal drops below threshold it simply drops out (is gone); see SF#11, p.11.

ASIASAT-2 C-BAND ANALOG TVRO ANTENNA DIAMETER

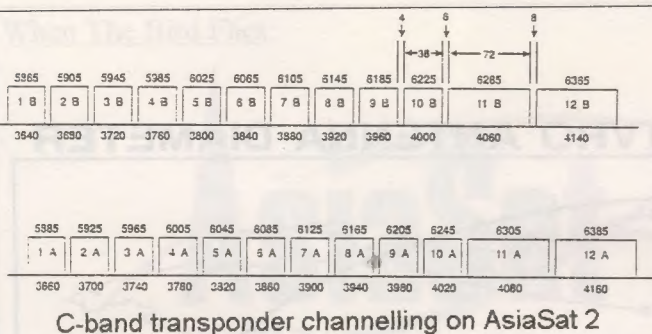
*Subject to local levels of adjacent satellite interferences

With an orbital position of 100.5E, AsiaSat 2 will sit at the western edge of the viewable orbit belt for New Zealand and other areas east of Australia. As detailed in SF#3 (p.'s 13-15) there will be a "look angle" challenge for users located between 155E and 180E. The look angle is the number of degrees above the horizon that the satellite will appear. New Zealand look angles to AS2 fall between 2 and 6 degrees (0 degrees would be a signal that arrives flush with the horizon assuming no hills, buildings or trees intervened). In other low angle locales, Fiji will be 3 degrees, New Caledonia 14 degrees, Vanuatu 13 and the Solomons 22. What this means is two things:

1) A satellite close to the horizon can be blocked by a tall building, a hill or even thick trees if these obstacles happen to fall in the wrong spot.

2) For all look angles below 15 degrees the noise factor for the dish is increased. A dish with a noise factor of 35 degrees Kelvin for a look angle of 45 degrees (such as the Paraclipse Classic 10+ model) will have a noise factor of nearly 60 degrees Kelvin at a look angle of 10 degrees. This noise factor reduces the sensitivity of your dish "system" (system: the dish, the feed and the LNB) and as the dish look angle becomes less and less, your pictures degrade because of the low look angle noise contribution from the dish and feed.

This is of concern, especially in New Zealand, where look angles are all low for AS2. There are several things you can do to compensate for this; some technical (we'll save those for another report) and some common sense.

1) Any proposed dish location should have the best possible elevation 'clearance' for objects in front of the dish when the dish will point at the satellite. For example, placing the dish atop a four story building (thereby getting the dish up higher and away from the noise caused by the earth) will be superior to placing the dish at ground level; even if both locations are clear of blockage. Less practical would be to raise the dish on a pole or tower to get ground clearance. Obviously, many homes in New Zealand will be shielded from AS2.

U/L Vertical	5865	5905	5945	5985	6025	6065	6105	6145	6185	6225	6285	6365
	1 B	2 B	3 B	4 B	5 B	6 B	7 B	8 B	9 B	10 B	11 B	12 B
D/L Horizontal	3640	3680	3720	3760	3800	3840	3880	3920	3960	4000	4060	4140
U/L Horizontal	5885	5925	5965	6005	6045	6085	6125	6165	6205	6245	6305	6385
	1 A	2 A	3 A	4 A	5 A	6 A	7 A	8 A	9 A	10 A	11 A	12 A
D/L Vertical	3660	3700	3740	3780	3820	3860	3900	3940	3980	4020	4080	4160

C-band transponder channelling on AsiaSat 2

AsiaSat 2 (100.5E) C-band signal level footprint(s)

2) The precise location of the dish, on the property, should be carefully selected to minimise any possible blockage of "field of view obstructions."

The Planned Services

A full list of programmers and the transponder assignments will not be released until AS2 is operational. We do know:

✓ C-band transmissions will fall between 3,620 MHz (IF: 1530 MHz) and 4,180 MHz (IF: 970 MHz). The 3,620-3,700 region is an expansion from most existing Pacific C-band satellites (Gorizont does use 3675, IF 1475).

✓ Unlike AsiaSat 1, where some transponders only appear on a 'northern beam' and some only on a 'southern beam', the full bandwidth of both polarisations will come to the Pacific.

✓ Most of the present AsiaSat 1 services will continue there in analogue. STARnet (also to be known as digiSTAR on AS2) will double up with their existing analogue services in NTL developed DVB Compliant (SF#9, p.14) MPEG 2. The basic free to air services of STARnet will be found in MPEG on AS2. With the freedom to compress as many as 8 to 10 digital programmes onto a single transponder, digiSTAR will also be offering a wide range of 'regional' TV services within its pay TV tier. These are expected to include Mandarin, Hindi, Cantonese, Tagalog (Philippines), Bahasa (Indonesia), Tamil and Arabic initially with more to follow. STARnet is very keen to provide a wide selection of regional services on AS2.

✓ English language pay TV services will include CNBC and NBC Super Channel as well as a movie service channel and a by-event live sporting coverage channel.

✓ Falling between free to air and pay TV there will be a one-time charged "Conditional Access' group of programmers that will include a new 24 hour German and English service from Germany's Deutsche Welle (see p.2, this issue).

More than 40 optional pay TV channels are likely to be available from digiSTAR by mid 1996.

The Receivers

Analogue receivers will not work with the digital services and at this time no 'adapter' to convert an analogue receiver to a digital unit has been announced. The first receivers available will be from Pace. The precise operational routine has not yet been detailed but anticipate that you will purchase a receiver and then pay a one-time 'conditional access' fee to get the receiver permanently turned on for many of the free to air services (see p.3, this issue); after that fee there will be no monthly charges for this class of programmer.

Seeing Is Believing:

PUTTING A SPECTRUM ANALYSER TO WORK

What Is It?

A spectrum analyser (analyzer in North America) is a piece of test equipment using a cathode ray tube (CRT or picture tube) to display squiggly lines that represent, after modest training, several very important parameters concerning the nature of satellite (or terrestrial TV) signals. These parameters include:

✓ The strength of the signal

✓ The frequency of the signal (a feature that varies from analyser to analyser)

✓ The width of a signal (i.e., whether it is full or half transponder, wide or narrow band)

✓ The transmission format of the signal (analogue FTA, analogue B-MAC [PAL or NTSC], digital et al).

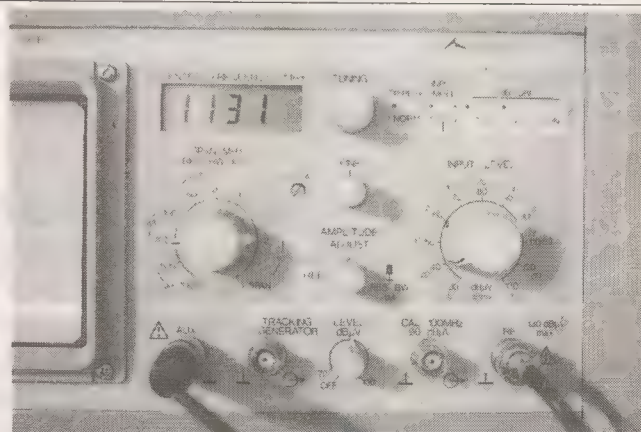
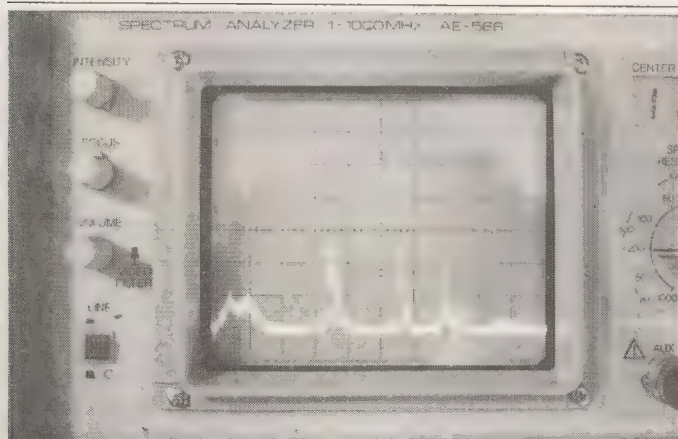
Spectrum analysers are designed for a singular purpose or for a wide range of purposes. They are designed to sit on a bench and only operate from local power mains (110/230/250vac), only from a self-contained battery pack, or both. And they are designed to function with a variety of input signal levels (from signals that are too weak to even detect on a satellite TV receiver to signals that come directly out of a modulator or low power TV transmitter).

For someone seriously into the satellite TV installation world, a proper spectrum analyser (equipped by design for satellite work) and perhaps an accessory or two is absolutely essential. Here are some of the reasons why:

✓ Virtually all spectrum analysers intended for satellite TV work have the provision to power an LNB. This means you can assemble a dish, put it on its mount and connect up the analyser. The analyser powers the LNB and by reading the 'signs on the screen' you can adjust the dish for peak reception (signal levels) while right at the dish without a satellite receiver and TV set present. And, the spectrum analyser will allow you to peak the dish to within 0.5 dB of maximum signal level (or even better); something you will never routinely do with the meter on a satellite receiver.

✓ With an analyser you can adjust the polarisation (or polarotor) for an absolute null of the non-desired polarisation sense; another adjustment you cannot make nearly as well with a straight forward signal level meter.

✓ You can 'see' as much or as little of the full satellite downlink band as you wish by adjusting the analyser. That means you can show on the screen the full 500 MHz (580 MHz with AsiaSat 2) and relate to all of the different signals simultaneously, or, you can adjust to just view a single transponder or even a very small piece of one channel (such as 1/36th of a channel).

✓ A spectrum analyser shows the present of 'energy' and it makes no difference to the analyser whether the energy is analogue or digital, FM or AM, narrow band or wide band. In other words, you can actually see the presence of signals which a normal satellite receiver

Don't be intimidated. This Pro-Max AE-566 is a bench (indoor) unit, 'cut in half' here for discussion purposes. The left hand portion is for display of signals and the adjustments (left hand edge) are similar to those found on any black and white TV set (intensity, focus). The right hand portion are the adjustments to establish the tuning frequency range, the span width (how much of the satellite band do you see at once), and the input signal level range. The top centre display number (1131 [MHz] shown) refers to the tuned-to centre frequency of display.

tries to ignore (such as digital signals on an analogue receiver or vice versa).

This is becoming increasingly important as our satellites are filling up with many signals of differing formats. For example, if your polarisation is mis-adjusted for PAS-2 horizontal and your CNN pictures have sparklies in them, how can you be sure the sparklies are not coming from the Prime TV digital feed located on the vertical side of the same transponder on PAS-2? You could try:

1) Replacing the LNB, suspecting it has a high noise temperature

2) Finding a receiver with a variable IF bandwidth to try to eliminate possible noise coming from tuning in a 20 MHz wide signal on a receiver with a 27 MHz wide bandwidth

3) Repeaking the dish for a better signal

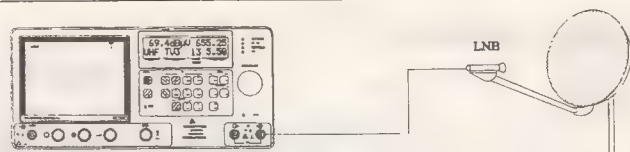
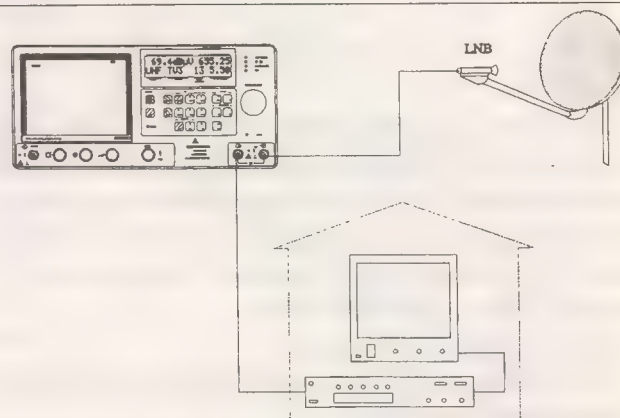
4) Twisting on the feed to find a better focus

You could do all of these things and never tumble to the fact that there is vertical signal leakage coming from transponder 13V into the CNN transponder 14H and what is really causing the problem is your receiver doing its best to ignore the foreign digital Prime signal ... and creating sparklies in the process.

Most receivers totally ignore digital signals (a few will show a modest increase in receiver S-meter registered signal strength when tuned to a digital signal and if the digital signal is not mixed with an analogue signal, you make also see a slight darkening on the screen along with an increase in bright white sparklies overlaid on the slightly darker screen). An analyser, on the other hand, shows you the distinctive 'signature' (pattern on the screen) of a digital signal.

✓Non television signals, including those analogue and digital, also do not register (or register very poorly) on a typical receiver. This is because the receiver is designed for a purpose: To process analogue, FM (frequency modulated) television signals. A group of telephone or data carriers (such as found on I174 and I177) are simply foreign to a TV receiver.

Other Applications

Most analysers can tell you within 0.5dB (or less) the exact strength level of any carrier you can display. Some analysers actually create a readout on a display screen of the particular carrier level you have selected to measure (using front panel controls to zero in on a single signal). Lacking this sort of numerical readout, the front screen of all units has a 'calibrated graticule' (transparent cover screen). At regular intervals on the graticule screen are horizontal lines which correspond to specific signal levels. You look at the signal level, see which graticule line it is just reaching (signals are typically displayed

LNB can be powered at dish by analyser ...

Or, some will 'power through' from (indoor) receiver

such that the stronger a signal is the more it rises upward or to the right on the screen), and then deduce the actual carrier level from that.

Say:

✓ You measure the signal level for each transponder on PAS-2 at the dish itself

✓ Take the analyser inside to where the receiver connects and measure again

Having done that, you discover that some of the transponders are much weaker inside than they were outside at the dish. The only thing in between the two measurement points is cable. Is the cable at fault?

Although it is possible to have a satellite-only spectrum analyser (if you did, it would cover the normal LNB 'IF' [intermediate frequeny] band such as 950-1450 MHz), most analysers available cover the region below 950 as well. This makes the analyser very useful for:

✓ Checking VHF and UHF TV off-air signal levels both at the reception antenna and at the TV set

✓ 'Seeing' the relative signal level on all of the TV channels simultaneously

This is very useful when you are installing a TV antenna in a region with less than strong terrestrial TV signals. Why? Because with the TV antenna connected to the analyser, you can move around on a roof or alongside a house to locate the one spot where all of the various TV channels are simultaneously strong (even moving the terrestrial antenna a few inches can make a whopping big difference in the strength of UHF TV channels!). By seeing all terrestrial TV channels at the same time, you will be amazed to see how one channel goes down in strength while another one comes up all in the space of a few inches of antenna movement. This

F81-A splice

Indoor receiver

Analyser at dish

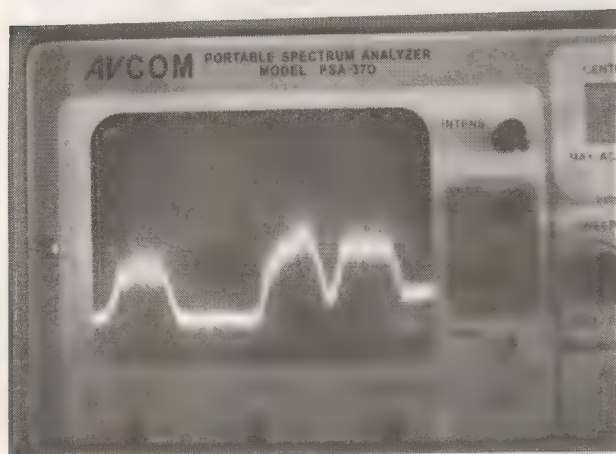
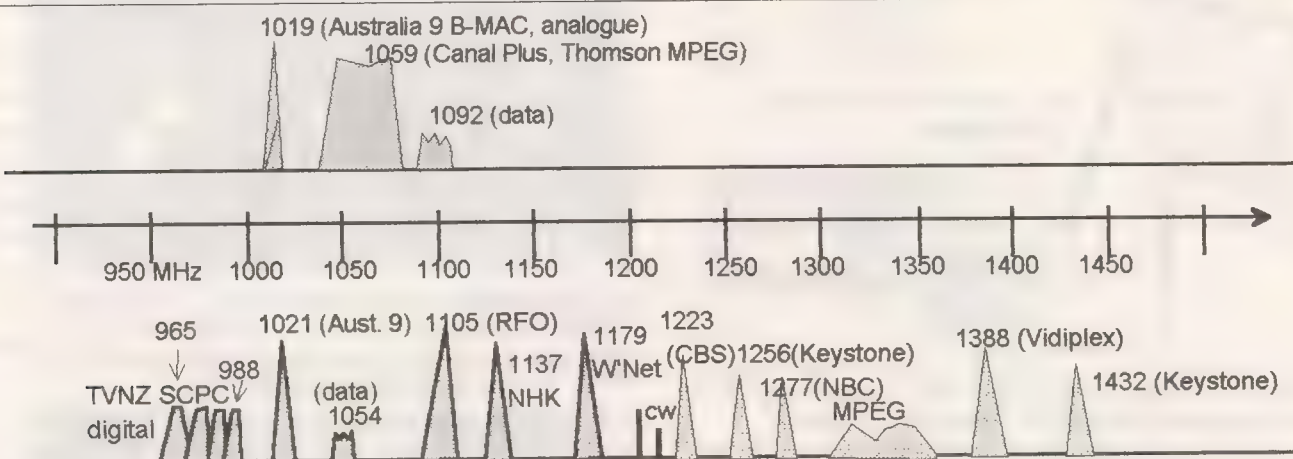
allows you to find the one best location for the antenna (where the normally weakest channel is strongest).

✓ You can adjust signal level traps by using the analyser to monitor both the undesired (to be trapped) and desired (to be protected) levels simultaneously, ending having to switch back and forth as you would with a normal TV signal level meter.

✓ In an SMATV or CATV system, an analyser is your most serious piece of test equipment. It allows you to measure levels, adjust amplifiers, check for cable faults, locate bad connectors, set up a headend, verify satellite incoming signals to the headend.

As you might expect, serious analysers cost serious money. That is not to say that you cannot (as a non-commercial user of satellite signals) get value from an inexpensive analyser that is intended for home rather

Using weatherproof 'L-band rated' F connectors (SF#8, p.14) and F-81A female splice at back of dish you can make 'test point' to insert analyser for alignment at the dish proper.

What Analyser Shows: Intelsat 180 late June. **Top set** - Left hand circular. **Bottom set** - right hand circular.

3 of TVNZ's 4 SCPC (single channel per carrier) MPEG 1.5 NTL channels on I180. Left is centred 964 MHz (IF), hole is missing SCPC (972) at time of photo, then 980 MHz and 988 MHz (8 MHz spacing). Signals on 3m dish are 4 to 5 dB C/NR; too low for recovery. These signals are 'invisible' on analogue receiver.

than commercial use; we'll look at that in this two part series.

How It Works

The principle behind a spectrum analyser can be simplified as follows:

✓ In its most elementary form it is a single frequency receiver which substitutes a vertical line on a cathode ray tube (CRT) for either a speaker or a television picture tube. When a signal is encountered by the "receiver portion" of the analyser it is converted into a line on the screen. The length (or height) of the line is an indication of the strength of the signal. Thus rather than hearing the signal in a speaker or seeing the content of the signal on a CRT, you see it as a simple 'blip' or line on the CRT. The 'blip' tells us many things about the signal including strength and frequency.

✓ There is a control on the analyser labelled "sweep width / span MHz." The narrower you adjust this control
the smaller the spectrum that the analyser receives. Therefore, the narrower the megahertz of bandwidth displayed on the CRT.

By using this control, you decide whether you wish to zero in on a single transponder, a portion of the transponder, or perhaps the entire satellite band (950-1450 MHz in the IF bandwidth from the LNB).

✓ There is another control that selects the input signal level "range" for full screen display. Most satellite signals at the dish are in the -10 to +20 dBmV (45 to 75 dBuV) range and you simply select the range that matches the signal level you have present. If you select a too high range, the blips on the CRT are very small; if you select a range that is too low, the blips go off the screen at the top. Simply turn the knob until the strongest blips (signals) seen fall towards the top of the display screen.

✓ A continuously tuned knob tunes the analyser receiver. A digital display shows the frequency which corresponds to the centre of the screen at all times. You can read (with an accuracy of several MHz) the actual frequency of any carrier (even MPEG) directly from the digital display.

You can also measure the 'width' of any signal with this digital display and the tuning knob, determine how many dB the signal is below the peak (centred) level at any point either side of the centre frequency. This is especially useful in determining the bandwidth of a particular transponder even before you hook-up a satellite receiver.

As you use the instrument you see there are significant differences between the way analogue FTA, analogue encrypted or MPEG signals appear on the display. You will learn what these differences mean and be able to identify signal content in this way. This will continue in SF#12.

Part Four:

ADDING SATELLITE CHANNELS TO A MASTER ANTENNA SYSTEM

Power To Reach The Rooms

An existing master antenna television system designed originally to pass one or two band I and / or three signals, later adapted for a third VHF channel and more recently modified again to add up to five Sky Network pay channels is a serious challenge. In Australia, the mixture of VHF and UHF off-air signals is no less difficult to unsort when attempting to find room for satellite delivered channels. In previous segments of this series we looked at how you rearrange the channels (and possibly replace channel amplifiers for VHF or modulators for Sky Network) to create new channel space.

An equally serious problem is the capacity of the system to carry one or more additional satellite delivered modulator channels without sending the system into a serious case of overload. There are two categories of MATV systems to be considered:

1) Those that generate sufficient 'transmission power' at the headend proper so as to not require in-house (repeater or booster) amplifiers;

2) Those that have amplifiers within the facility (often hidden in a closet or behind a wall and long ago forgotten).

Every amplifier has a maximum rated output. If you exceed that output rating (typically expressed as so many dBuV per channel for 'X' [some number of] channels) the amplifier generates its own internal distortion products. A quick lesson in this is quite simple; tune in a heavy rock station on your car or table top radio and crank the volume up full. The heavy base notes will 'thump' through the speaker and your first instinct is that the speaker may self destruct. It is not the speaker that is self destructing; rather, it is the amplifier generating distortion that is creating the racket. TV amplifiers follow the same physical laws only what you get is not a racket in the speaker but rather a mess on the screen.

A TV line amplifier rated at:

"+118 dBuV output for 6 channels
+115 dBuV output for 12 channels
+112 dBuV output for 24 channels
+109 dBuV output for 48 channels"

is telling you the maximum per-channel output levels permissible before the amplifier begins to generate distortion. But what does distortion look like in a TV system? We know what it is in an audio system; it sounds bad!

To say that it will "look bad" is an over simplification of a complex problem. There are three primary categories of distortion that crop up when a TV amplifier is run too hard.

1) Crossmodulation (abbreviated Xmod)
2) 2nd order intermod
3) Composite triple beat

Any one of these causes a picture to "look bad" and viewers to complain.

Crossmodulation is the result of the modulation (picture information) on one channel transferring to another channel. Most often the strongest channel picture ends up appearing as a film on top of the image of a weaker channel. The sound is usually not affected. This occurs when an amplifier is overdriven (too much signal goes in, indicating the amplifier has been placed too close to the headend or the preceding amplifier). The quick, dirty solution to crossmod is to back track

through the system until you locate an amplifier which has no crossmod. That means this one is not being over driven but the one that follows it (with crossmod) probably is. The solution? Take a 3 dB in-line pad and insert it at the input of the first amplifier experiencing crossmod. If 3 dB of pad makes the pictures better but there is still a film visible, go to a 6 dB pad. The concept is that if you reduce the input low enough you will bring the amplifier back in line where it is not being over driven. Suppose you put a pad in but when the crossmod disappears with the final value of pad the pictures from that amplifier onward have snow (noise) in them? That's a special problem and we'll return to it.

2nd order intermod is the result of an amplifier acting both as a signal booster and as a frequency doubler. Every amplifier ever created will take the input signal and generate harmonics of the input frequencies while it amplifies. A signal that appears in the amplifier at 90 MHz is amplified and doubled at the same time. In a properly designed amplifier, the double frequency (90 x 2 = 180 MHz) is at a very low level. But it is there and if each in line amplifier does the same thing, eventually the very low level of the second order (2 times primary frequency) signal becomes strong enough to interfere. Fortunately, 2 times many frequencies (such as 2 times 55.25 MHz (channel 2 in NZ), or 57.25 (channel 1 in Australia) falls quite harmlessly at 110.50 and 114.50 respectively. These are not channels normally used for television carriage, even on SMATV and CATV systems; any beats generated by an amplifier on these frequencies will not interfere with anything important. On the other hand, if a MATV system elects to use superband channel S4 (126.25 MHz) and superband channel S14 (252.25), the second order beat from S4 will end up almost on top of the video carrier of S14.

You avoid second order beats by selecting amplifier designs which actively suppress these undesirable products. In this way you preserve a 'clean spectrum' for future growth (by selecting cheap and dirty amplifiers that do not respect second order beat problems, you are leaving behind a legacy in the system which will possibly haunt the next guy that tries to add more channels in the future).

Composite triple beat is the most devilish of all. Here TV channels on widely separated channels (such as 57.25 and 175.25) mix together. There is a sum (57.25 + 175.25 = 232.50) and a difference product (175.25-57.25 = 118 MHz). In this example, if you have no composite triple beats that fall into TV channels you will be using, your situation is analogous to the tree falling in the woods. Nobody sees your handiwork. On the other hand, 232.50 in our example falls into superband channel S11; a favourite in many quarters with those squeezing an extra channel in "just above the top of the terrestrial TV channels."

Again, you avoid composite triple beats by selecting an amplifier that actively suppresses this mixing action. As with 2nd order intermod, once the evil deed has been done, there is no magic filter or other device you can insert in the line (as with crossmod and an in line pad) to clear up the mess.

Too Many Channels

One of the easiest ways to get into trouble with any of these degradation formats is to try to squeeze too many channels through an amplifier at too high levels. Go back to the quoted specs on page 13:

"118 dBuV output for 6 channels
115 dBuV output for 12 channels ..."

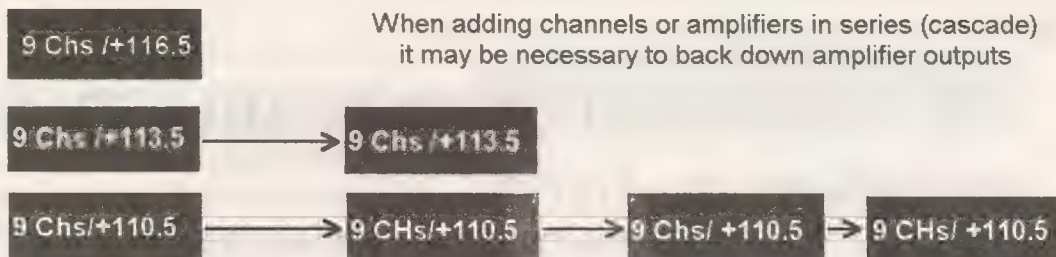
Notice that each time the number of channels doubles our maximum output power is halved; it goes down by 3 dB. (Yes, a 3 dB reduction in signal level is the same as cutting the signal voltage in half.) This sort of specification is in no way similar to a posted highway speed limit. If you are operating 7 channels at "+118 dBuV" through this particular amplifier, it is not the same as going 105km/h and not getting zapped by a speed camera. When you add even one more channel than the ratings tell you are maximum, back down the amplifier's output level (using the output level control)

Amplifier specs should clearly state maximum output levels as a function of number of channels. Specs should also give performance data for amp distortion.

When adding channels or amplifiers in series (cascade) it may be necessary to back down amplifier outputs

9 Chs /+116.5

9 Chs /+113.5 → 9 Chs /+113.5

9 Chs/+110.5 → 9 CHs/+110.5 → 9 Chs/ +110.5 → 9 CHs/ +110.5

to the next lower dBuV number. If you have several amplifiers in series (cascade), they all must be turned down the proper amount to ensure that the amplifier's ratings are not exceeded down the line.

Which brings us to an important and often overlooked part of laying out an MATV system design; determining proper amplifier output levels when there are two or more amplifiers in series (i.e., cascade).

Assume a long motel requiring four amplifiers in series to reach from the headend to the last room signal drop. If there are 6 channels on the system when you start and 9 when you finish, and the rating for the amplifiers says "+118 dBuV for 6 channels," at what level output do you adjust each of the four amplifiers?

If +118 dBuV equals 6 channels and +115 dBuV equals 12 channels, then nine channels should be around +116.5 dBuV. Right?

Partially correct.

Amplifiers are rated in specification sheets as if they are going to operate alone; i.e., not two or four in series, but one all alone. Just as you must derate the output of a single amplifier by 3 dB when you double the number of channels (carriers) pushed through the amplifier, you may also need to derate an amplifier by 3 dB when you run two amplifiers in series. And by 6 dB when you run four in series. Why is that?

Primarily because of 2nd order intermod and composite triple beats. Single-ended amplifiers (those that use a single non-hybrid amplifier device in the output stage) are especially prone to the generation of 2nd and 3rd order beat signals. You get around their shortcoming by derating the amplifier output by 3 dB for every doubling of (a) channels, and/or, (b) amplifiers in cascade. In our example of 9 channels and 4 amplifiers, if all are single ended designs, your output power would be 116.5 dBuV minus 6 dB (3 dB for doubling from 1 to 2 amplifiers, another 3 dB for doubling again from 2 to 4 amplifiers). So that means an amplifier you purchased hoping to get +118 dBuV out of it must now run at no more than +110.5 dBuV if you wish to avoid the generation of beats.

Is there a way around this derating problem?

Buy a better design amplifier. There are three design variations that greatly improve upon the older style, and import quality, single ended amplifiers:

1) Push-Pull (hybrid) (output stage)

2) Power addition (hybrid) (output stage)

3) Power doubling (typically hybrid) (output stage)

Each of these designs actively suppresses crossmod, 2nd order intermod and composite triple beat. Take a few minutes to read and understand the numbers in the specification sheet for an amplifier.

Crossmod: Any number lower than -60 is not good. An amplifier that doesn't tell you their crossmod number is not advisable.

2nd order intermod: -70 dB is the lowest you should accept (-71 is better than -70 and so on).

Composite Triple Beat: -58 is the minimum.

Better numbers than those shown mean you are buying some headroom for future problems, and the ability to place amplifiers in series (cascade) with fewer concerns that any of these three forms of signal degradation will crop up to haunt the installation.

This series will continue in SF#12.

Part Five:

THE NEIGHBOURHOOD CABLE TV SYSTEM

New Tricks With The Family Dish

Ecological Sensitivity Quiz

You and your neighbours have four choices, as follows (which one would you select?):

1) Place a TV aerial on your roof and watch only the local terrestrial TV.

2) Place a TV aerial on your roof to receive local terrestrial TV, add to that a satellite dish of some size (on roof, side of house or in yard) to watch satellite TV.

3) Take down the terrestrial aerial, and connect up the TV sets in the house to a piece of RG6/U cable brought to the house through the air from the nearest utility pole with 20 channels of TV.

4) Take down the aerial and bring the TV in through a piece of buried RG6/U cable.

Which one did you select? Most would choose number four ... provided.

Provided the costs for this were comparable to number 3 and the TV cable company didn't ruin your flower bed in the process of digging a trench across the yard.

As a Neighbourhood Cable TV operator, you will be faced with similar questions. Only as a cable TV operator, you will have another concern that hits closer to home than the ecological question of, "Where do you want your wire?" And that is? The cost differential between choice 3 and choice 4.

Overhead or Buried?

If the area you plan to cable already has utility lines (power and telephone) underground, your choices are limited to:

1) Running your cable underground along with the utilities, or,

2) Going from house to house along fences (where available), even from tree to tree if you can figure out a way to keep the neighbourhood kids from using your coaxial cable as a swing.

If some utility lines remain overhead, you have a possible choice of renting space on the utility poles (typically power, not telephone) to suspend your cable(s). What are the costs and problems associated with each?

Utility Poles

First you must convince the utility company that having you as a customer on their poles is to their advantage. In most jurisdictions (countries) there is no law that can be used to force this consent. It is to their advantage, because:

1) They receive income from you for the space you rent (the per pole fee is a matter of negotiation; A/NZ$10 per year [per pole] is an average number).

2) They may require that you allow them to actually perform the labour of installing your cable(s) and equipment boxes; a source of revenue to their construction department.

3) By doing business with you, a 'little cable operator', they forestall the likelihood that a more formidable competitor might start up in their area (example: In New Zealand, power companies typically stay in their own patch and don't directly compete. However, recently one power company [Bay of Plenty Electricity] has begun to install cable TV service systems inside of the 'district' [patch] of nearby competitors. This patch-jumping makes power companies nervous.)

4) You might grant the power company an option to acquire stock shares in your cable TV company, another incentive to their renting you space on their poles.

And it is to their disadvantage to allow you on their poles, because:

1) Your wires might be considered a nuisance; their personnel will be forced to work 'through' your cable TV wire(s) in order to reach their own (top of pole) electrical wires.

2) Their 'pole plant' (the network of poles and wires) may be marginal and scheduled for replacement with either new poles or a move to burial of wires.

3) The power company may have medium to long term plans to be in the cable TV business themselves.

You start, then, by knowing where you wish to go with your cables because the first thing the power company will need to know is "which poles do you wish to attach to?"

Step One: Plan (layout on paper) your cable TV lines. Do this using a scaled street map (available through local council offices). Walk the streets and add to the map every pole already there in areas where you wish your cable to go. Using a coloured pen or pencil, draw lines to represent the cable TV lines.

Step Two: Take photos of a sampling of their poles you wish to attach to and draw onto the photos where your lines would attach. Regulations will state that your "communication class" (cable TV) lines must be a specified distances away (separated) from any pre-existing electrical wires. A number such as .6 metre separation between power secondary (which serves customer homes) and cable TV is usually prescribed. At the same time, regulations prescribe a minimum safe (clearance) distance between the lowest wires on any pole and the street or ground below; 4.5 metres is an example. Obviously the pole as it exists must have sufficient room left to allow you to be a safe distance below their wires, and still be a safe distance above the ground.

"Which poles?" Set of photos, suitably marked by you, will illustrate your plan.

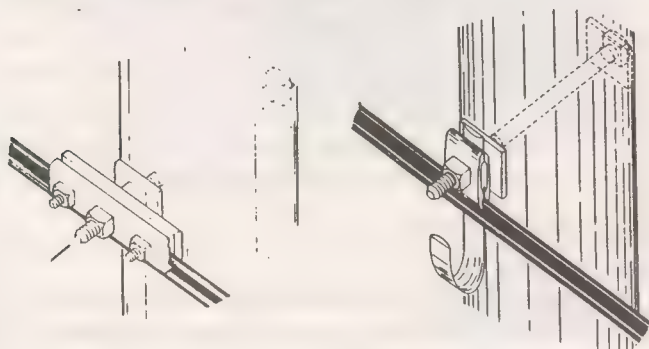
Step three: Go and see the power company employee responsible for their 'network' (sometimes called Network Manager) and make your proposal. It will be helpful to you to have with you a copy of a cable TV plant construction guide (1) which will explain and illustrate in terms he will understand precisely what you need.

If the power company is interested, their first concern will be with the space and safety considerations: Is there room on the poles and will be it reduce their safety factor? Most poles will have space but where they have

1/ Ask for CommScope 4th Edition CATV Cable Construction Manual from Ross Patterson, Maser Technology Group, PO Box 65-166, Mairangi Bay, Auckland (tel 64-9-479-7889; Fax 64-9-479-6536).

Sidearm mounting (2 approaches). Assume the power transformer is located just below point of sidearm attachment to pole.

power transformers on the poles special problems arise since the transformer will usually be located such that you cannot go under it (and still have safe ground clearance). One solution is to go 'around' it with a sidearm mount that offsets your cable TV line from the pole by the required .6 metre safe distance. A less desirable solution is that you go 'under' that pole by going from overhead (on poles) to underground a pole before the power transformer pole, bypass the power transformer pole underground, and then return to the air at the next pole beyond the power transformer.

Options cost money. The least expensive attachment to their pole uses a device such as a '3-bolt clamp' or 'J-hook support'. You will pay for the hardware to attach your cable as well as the labour to do so. Sidearm mounts multiply pole hardware and labour costs by 3 to 5 times over 3-bolt or J-hooks. It is in your best business interests to keep capital (system construction) costs to a minimum.

3-bolt (left) and J-Hook typify standard hardware

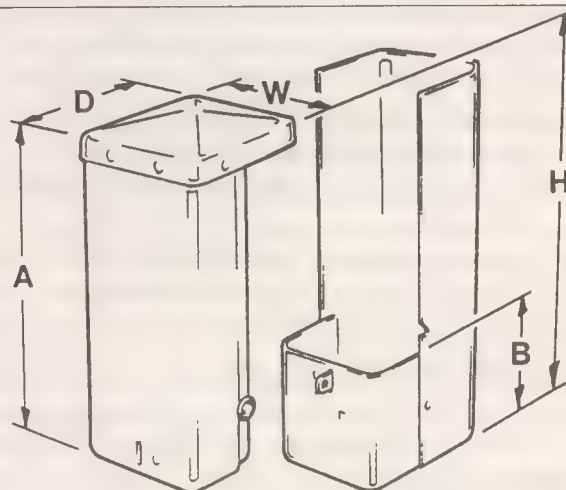
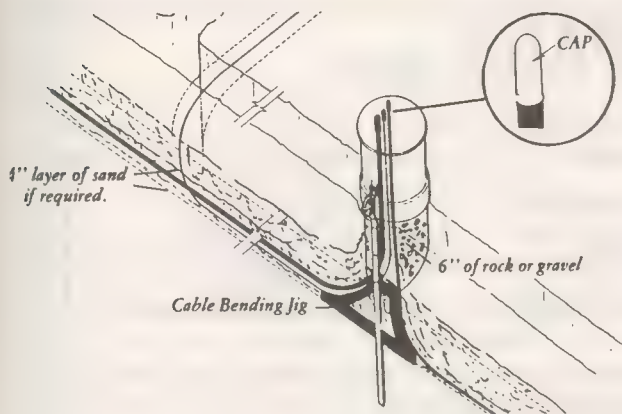
What kind of costs are we looking at here? Some background.

1) Most power utility poles average 70 metres between poles; shorter distances in heavily urbanised areas, greater distances in rural areas. Thus there will be 14(.29) poles per kilometre on average. It is useful to talk of cable TV system costs and designs on a per kilometre basis.

2) To install your cable system 'plant' for a kilometre using burial techniques in 'moderate' soil involves digging a trench (with a machine; seldom by hand!) that will cost you on average A/NZ$2.75 per metre in a clean area. Definition of clean area: No streets to cross, sidewalks or kerbs to go under. As soon as you start crossing (cutting through, punching under) streets and other man-made barriers, the cost per metre escalates.

This gives us a reference number; in the best case a kilometre of buried plant will cost you A/NZ$2,750 for the labour of getting it put in.

3) The hardware (using 3-bolt or J-hooks) per pole will cost you around A/NZ$20 per pole. For 14(.29) poles you will have $285.71 in hardware. The labour to install the hardware and cable will vary but $1 per metre is a reference number. Thus for a kilometre of aerial plant you might have $1,285.71 for materials and labour ($89.97 per pole touched). If there are difficult poles along the way, the costs would be greater.

But there are other costs as well. In the case of a buried plant, at each point along the way where you will have a cable amplifier, splice, customer connection box (directional tap) or signal splitter, you must install on the ground a housing to protect these items. These "pedestals" will cost you around A/NZ$42 each (or more for larger pedestals, as required). In 1,000 metres of buried plant with average lot widths of 30 metres you will have a pedestal at every second lot line; 17 in our example. Setting aside the labour involving pedestal and equipment installation, this comes to at least $714 per kilometre. This makes the labour and hardware content

Typical 2-piece ground mounted pedestal (mounts with ground stake); sized for each location.

Buried plant cables are brought to surface inside of pedestal for connection of equipment, splicing

for a buried kilometre of cable (not including the cable, the connectors or the electronic pieces) $714 + 2,750 or $3,464.

A buried plant will probably attract no annual rental costs for the underground space occupied (**2**); an overhead plant always will (call it $10 per pole per year). With 14(.29) poles per kilometre, that is $142.90 per year, $1,429 in 10 years.

So which is the least expensive way to install your cables? Between utility pole overhead and underground, in our example of costs per kilometre, we have a total first year cost of $1,428.61 for aerial (including year one pole rent) against $3,464 for the burial. In ten years we have $2,714.71 aerial against the original $3,464 burial.

Neighbourhood Option

But are you forced to decide only between utility pole aerial and burial? The answer depends upon the size and make-up of your to-be-cabled area. And the degree of co-operation you can achieve with your "neighbours."

Another approach is to stay above ground but utilise back lot and fence lines for routing of the cable. In a model application, every backyard would have a fence installed and your cable would (with the written permission of your neighbours) attach along the bottom side of the fence just above the ground line. In a less than ideal situation, you would use the fence for attachment where this was available, and between fences you would go underground a small (perhaps hand dug) distance.

This "small time cable" (Mom and Pop cable system) approach is already being used in two areas of New Zealand and more are planned by Neighbourhood Cable TV operators. We'll start here in SF#12.

2/ A recent Auckland (NZ) High Court decision has ruled the telephone company must pay annual "rates" for space used by poles or underground when installing equipment on 'common (public) property'. A second court case will decide what rates apply; cable TV may also be required to pay similar rates. See CTD May 31; p.18.

A technical and marketing advisory

memo

to the membership from your industry trade association group

SPACE Pacific

Satellite
Programme
Access
Committ**E**e

A trade association for users, designers, installers, sellers of private satellite-direct systems in the POR

[illegible]

Promotion: The Missing Ingredient

Satellite television dealers are faced with a set of perplexing problems:

HOW do you explain the many advantages of owning a home dish system from an industry that is itself beset with so many unknowns? Issues such as scrambling (encryption), access to programming, programming fees abound. Top that off with the multitude of new satellites scheduled over the coming 12 months and mix in digital (MPEG) versus the phase out of analogue and you have enough confusion to write a book.

So SPACE Pacific has written a book. SATELLITE TELEVISION: All You Need to Know is a 28 page (plus, we think, attractive four-colour cover) consumer level, friendly description of what satellite TV is all about. Borrowing from the many writings of the father of satellite communications (Arthur C. Clarke, a close friend and reader of SatFACTS) this book helps guide the neophyte reader through the many complex issues that beset home dish systems today. The intention of this book is that as a dealer you can answer as many of the consumer's questions as you are able, and then present them with a copy of the book. The dealer has two choices; make a gift of the book (SPACE dealer member pricing is well under half of the front cover A/NZ$10 cover price), or sell it as a trade item for any price up to the $10 amount. The book plugs no particular brand of equipment, and discusses pricing only in very general retail terms. It is the responsibility of each dealer to establish his own equipment choices and to set his own installed home dish system price.

SATELLITE TELEVISION: All You Need to Know will help dealers sell systems. It will also be an authoritative reference source for answering tough questions (such as, "Can I get my MTV?"). Every dealer has some prospects he would like to get over the decision hurdle and "the book" will help that happen.

But this book alone is not likely to measurably increase the flow of new, unknown prospects into a dealer's shop. Here SPACE is trying a media promotional campaign as a test, first, in New Zealand only. A major publication is scheduled to carry a generic advertisement for home dish satellite systems and announce the availability of "the book." New Zealand dealers who opt to be a part of this particular phase of the programme will be listed in the advertisement as a source of satellite television systems, and, for "the book." In this way we hope to generate new trade from new prospects for dealer members.

A second phase of this project, with an updated version of "the book," is scheduled for January; to coincide with the **South Pacific Region Satellite & Cable Show** in Auckland. The final day of **SPRSCS** (January 27; a Saturday) will be an 'Open Exhibit Day' for the public and a sizeable publicity campaign will invite interested members of the public to come and tour the exhibits, touch and feel satellite dishes and press their noses to giant screen TVs displaying the many exotic programming services available exclusively on satellite (it will not hurt things if AsiaSat 2 is operational by late January!). Dealer members will participate in this as well, with special dealer tables to be set up within the display area where individual dealers with signs announcing their trade area can talk

BECOMING A PART OF "THE SPACE TEAM"

To become a member of SPACE Pacific gives you a new level of access to satellite programming and programmers, hardware and hardware suppliers. There are four categories of membership covering privately owned and operated dishes (DTH) through sales and installation, retransmission of satellite programmes and hardware / software creation. You are invited to study the benefits and options of SPACE membership by writing for the no-obligation SPACE Membership Package: **SPACE** Pacific, PO Box 30, Mangonui, Far North, New Zealand. Members also receive discounts for attending our annual South Pacific Region Cable & Satellite Show and access to special membership sessions during the annual trade show.

with consumers about a home dish system for their backyards.

Through all of these marketing efforts we are soliciting member feedback through the 'Membership Notes' newsletter publication seeking to fine tune the results for 'the next time'. During SPRSCS, dealer members from Australia will attend a special meeting where leaders in that country will work together to create similar SPACE funded and managed marketing programmes for Australia. As an interim tool, "the book" will be every bit as effective in Australia as in New Zealand (it is written to be as neutral as possible as to where a consumer might live).

Programme Access Update

Michael Fleck of Satellite Management International (Sydney; tel. 61-2-977-1088, Fax 61-2-977-094) is as frustrated as many of our members are that MTV seems to be so slow in getting their DTH authorisation programme underway. As we reported in SF#10 (p.17), Fleck's firm has an agreement with MTV Mandarin to represent them in the Australia-New Zealand region. MTV shifted from free to air on PAS-2 to NTSC B-MAC encrypted June 1st with no prior warning; they had previously announced remaining FTA until August and an "orderly shift to encryption." The sudden turn on of B-MAC and some serious problems in their Asian target areas seems to be the cause of their failure to come to grips with the hundreds of customers who have contacted Fleck to date. Members point out that MTV English remains free to air on Palapa B2 and ponder why the Mandarin version should be encrypted on PAS-2. And we point out that when Palapa C1 replaces B2P in February (January scheduled launch) the programmers on B2P will migrate to the new C1 satellite. At that time, if MTV English has not encrypted, it will arrive in FTA form throughout Australia and New Zealand (plus most of the Pacific) on dishes in the 2.5m and down range. How all of this goes together in a coherent business like manner is beyond our ability to sort out! There is the possibility that MTV Mandarin might turn off their B-MAC machine of course; stranger things have happened.

Turner's TNT / Cartoon Channel service appeared in NTSC B-MAC early in the evening of June 30th; essentially as last promised. Turner Sydney (Gwin Scott, tel. 61-2-957-5255; Fax 61-2-957-5161) remains the place to talk to concerning CATV, MDS, SMATV and DTH subscriptions. We have the feeling as this is written (July 10) that while Turner Sydney has accepted orders and payments for the Scientific Atlanta model 9708 B-MAC IRDs required for this service from many firms (cable, SMATV) and people (individual DTH consumers), the IRDs are not yet being routinely shipped.

WITH THE OBSERVERS

READER HELP REQUESTED:
Any reader in Australia, New Zealand or the south Pacific with a Ku feed and LNB that will work on a downlink of 11,525 MHz please contact us at SF immediately. We may need your help for a test being scheduled. Fax 64-9-406-1083

John Bracey (Mirabooka, WA) reports some municipal districts in and about Perth (Gosnells et al) are reacting at the council level to the installation of private home dishes and threatening legal action against dish owners. Newspaper reports supplied by Bracey note:

"The WA Municipal Association is preparing guidelines on the control of dishes ... Gosnells is going ahead without the association's findings and is expected to present its own policy on the dishes at the next council meeting."

Muncipal/council zoning against dishes has been a thorn in the industry's side since the first dishes in America in the late 1970s. With thousands of council / municipal entities, a quagmire of local regulations resulted there (dish size limits, dish height and location limits, dish colour limits, dish permit procedures). Ultimately the US trade association was able to gather support from Congress and the FCC (federal communications regulatory body) to enforce a federal pre-emption of local laws. The basis for the federal intervention was the consumer's right to have access to any radio or television station they wished (freedom of access to speech); anything less amounted to censorship of viewing and listening choices by creating artificial limits on reception.

NOT a happy neighbour. Perth community newspaper published this photo of a neighbour pointing out the "ugly eyesore" of a dish next door. Claims the dish is unsafe were refuted by the deputy principal building inspector. The mayor of Gosnells told the press, "*It could have grown arms and grabbed me around the neck, it is so big! Talk about visual pollution - I nearly fell out of my car.*" (Note to Alek Z. Is this your dish they are on about???)

SatFACTS encourages readers with knowledge of similar problems to bring them to our attention; there may need to be a response here from SPACE Pacific.

Gary Salisbury (Gunalda, QLD) and virtually all other reporters say the new CNBC Hong Kong uplink (now in PAL) is several dB hotter through PAS-2 than the former Sylmar, California uplink in use.

Reports on TNT / Cartoon channel signal strength from most early observers suggests the transponder is similar in level at this time to ESPN and Discovery. As TNT immediately went to B-MAC encryption at launch our plans to provide a detailed analysis of reception 'quality' from observer reports were dashed; we are still interested in reports of relative signal level readings

WITH THE OBSERVERS: Reports of recent changes in satellite operations, programmer sources, equipment changes are encouraged from readers / observers throughout the Pacific Ocean Region. Information shared here is a valuable tool in increasing our understanding of the satellite system 'universe'. Off-screen photographs are easily taken: Use ASA100 speed film, set camera to f3.5-5 at 1/15th of a second (PAL, SECAM) or 1/30th of a second (NTSC) and hold camera stable. Alternately, any VHS speed / standard tapes may be submitted and SF will shoot the photos. Use reporting form found on page 29 this issue; individual reports can only be acknowledged by way of appearing in print here. Next deadline: 2 August.

(with or without spectrum analyser measurement help) to piece together the best report we can for Turner. One early report of note: **Raymond Wohler** with a 5m dish in Papeete, Tahiti reports the TNT signal is only 'fair' there.

Harald Steiner (Itabashi-Ku, Tokyo, Japan) helps us better understand the excitement of owning a dish in his region of the Pacific. Amongst his impressive selection of programming, a strong Ku signal from Gorizont at 140E, 3 US network feed Ku channels on Intelsat 177W and more US network feeds on I180 (totally clear on just a 60cm dish!). Details include: Intelsat 503 (177W; not E) horizontal northern beam Ku on 10.970, 11.015 and 11.510 GHz; Intelsat 511 (180) horizontal northern hemi beam Ku 11.135, 11.480 and 11.510.

Steffen Holzt, Studio 7 (Noumea, New Caledonia) has completed a detailed sky search at his location using a combination of dishes at his disposal. He feels there are two important bits of new information: Optus B1 SBS and ABC signals on Ku there are P5 (perfect) on a 3m solid dish, and, PAS-2 half transponder signals are below the level most have previously assumed. His findings are above.

Satellite	Location	Service	Dish Size	Quality
Palapa	113E	CFI	4.8m mesh	4
		Gold Net	4.8m mesh	3
Rimsat	130E	RAJ-TV	<3m mesh	5
Gorizont	140E	Muslim	3.65m mesh	4
		NTA (I)	3.65m mesh	2
Rimsat	142.5E	EMTV	3m mesh	5
		ATN	4.8m mesh	3
Optus	160E	SBS	3m solid	5
		ABC	3m solid	5
		9-feeds	3m solid	2
PAS-2	169E	CNN	3.65m mesh	3
		CNN feeds	3.65m mesh	2
		CNBC	3.65m mesh	4
		NHK	3.65m mesh	5
		Sylmar	3.65m mesh	5
		ESPN	3.65m mesh	5
		MTV	3.65m mesh	5
PAS-2/Ku		ABN	3.2m solid	5
Intelsat	180E	RFO	3.65m mesh	4
		W-Net	3.65m mesh	4

Steffen notes Palapa 113E has other channels at his location but they are far too weak to be usable. That just these two should 'sneak through' to New Caledonia is another example of satellite antenna side lobing. Incidentally, we really like Steffen's method of rating signal quality (see table on next page) and encourage others to adopt the same reporting standard for reports to SF

An official at Galaxy (Australis) advises, "*B3 will be in final orbital position on or around 15 August. Galaxy will take immediate occupation of B3 for testing of our NTL MPEG 2 compression systems and Irdeto conditional access encoders. Once testing is complete (+/- 4 to 6 weeks), we will swap out a few hundred GI Digicipher 1 decoders and then*

Steffen Holzt's Recommended SatFACTS Reporting Standards

In future reporting to SatFACTS we ask that you adopt the 'Holzt Standard' as follows:

P5 - Noisefree on 27 MHz (full) bandwidth

P4 - Bandwidth reduced below 27 MHz; no sparklies

P3 - Bandwidth reduced, sparklies present

P2 - Watchable (sparklies significant, picture detail unstable [jitters])

P1 - Must be an enthusiast to watch (!)

roll out the new PACE/Irdeto digital DTH decoders." This suggests launching of Galaxy promotional programmes for DTH service around 1 October in Australia. The future of the presently-in-use GI 310AP receivers for Galaxy will be outside of Australia; don't look for these to show up on the surplus market. GI says they have a future home elsewhere. Of the Digicipher units available: Model 310AP is an uplink-only addressable receiver (cannot be readdressed by the in-field user); the DSR1500 is a Digicipher 1 (but they claim upgradeable to 2) MPEG receiver that also has Videocipher and analogue receive built-in. The DSR 2200 is a Digicipher 1 only MPEG unit in use with a US pay TV service.

A Pacific area rumour that AsiaSat 2 will launch on July 29 is squelched with an advisory from a senior person at STARnet: *"AsiaSat 2 will not even be in China on the 29th of July; at best, arrival at the* (Long March) *launch site in mid to late August."* See p.2 this issue for other views on the same subject..

Frank Hung (Changhua, Taiwan) provides a bit of useful information concerning the TDRS (F5) satellite resting at 174.3W (not east). This satellite has a northern hemi-zone beam feed and perhaps some of our more equatorial region readers might locate the BBC World Service TV feed on 3987 MHz (IF: 1163), horizontal.

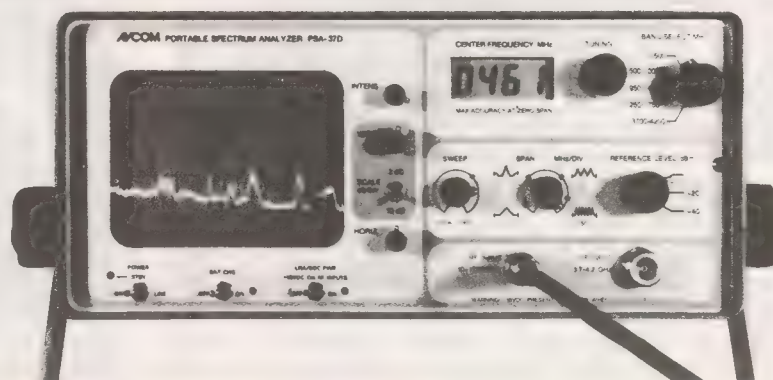
Mark Marfell, chief engineer at Kiwi Cable (Paraparaumu, NZ) reports early test results using their massive 16m dish (not a misprint) directed at the US satellite belt. Following tests reported in SF#3 (p.11) at the University of Auckland 7.3m dish, Marfell arranged a GI DSR1500 receiver (see review, SF#6, p.5 and SF#7, p.9) and reset the massive dish feed for optimised linear reception from the US domsats. As SF reported with the University tests, a number of US satellites are visible if your dish is large enough; around 6 channels from Satcom family satellites were P2 or P3 at the 7.3m terminal. Marfell reports P4 and P5 reception on a variety of FTA plus Videocipher encrypted services (including 135W Satcom C4's Travel Channel, MTV East, Discovery East and American Movie Classics). Occurring after our deadline for this issue, tests on several Digicipher encrypted channels (including pay per view Request TV and Viewers Choice). Imagine that - genuine US pay TV in New Zealand and all it requires is a 16m dish!

Brian Rasmussen (Manjimup, WA) reports a P4 class signal with Hindi programming ("TV1") from a satellite believed to be at 80E; 1/2 transponder format on 3885 MHz. As SF#9 (p.18) noted, Gorizont 24 (Stationar 13) was the last satellite reported at this location. A German source lists Vietnam TVand TV 6 Moscow sharing 3875 but in a northern hemi-beam (not likely to be P5 on Brian's 2m dish). Anyone else spot this one?

Peter Fischer (T he Satellit e Shop , tel. 61-75-944-911 outside Australia, 61-75-960-962 fax and phone inside Australia) has several tracking second hand units for sale: Astro Guide IIC, Panorama, Supertrack R SAC 2000 and an Echostar SR 4500. He suggests many readers may well have used equipment around that could help newcomers to get started and suggests a trading column in SF. Comments? Send your own list of used gear with your thoughts!

EMTV update. They put up the next week's programme schedule every Wednesday and you can access it with fax polling by ringing +675-325-450.

PanAmSat was 'shocked' to read here their transponder 3K which is connected to PAS-2 Ku China 2 beam, is being received very well (above threshold) on 1.5 to 2m size dishes in western Australia (near Perth). This is an English language (Mandarin subtitled) service intended for Taiwan cable users. In theory, this signal should not be receivable even with a 10m dish in Perth. Try on an IF of 1032, polarisation H. One NZ reporter believes he is getting it in Auckland area!

Staying Out Of Trouble:

RULES of FORTUITOUS RECEPTION

Free To Air - Yes or No???

So there you are on a quiet evening tuning through the active transponders on I180 and up pops a P3 picture with what appears to be a Russian sound track. "*What's this?*" you ponder. A bit more fiddling and you find a second audio carrier, in English. After a few minutes of listening you decide you have dropped in on a computer technology seminar of some sort. Into your VHS machine goes a tape and you begin recording. You have a friend who is a computer freak - he might be interested.

Have you broken any laws? Should you shut off the lights, draw the blinds and lock the door in case someone "in authority" might drop in to see what you are doing? Are you going to get into trouble? What are the laws regarding "fortuitous reception (1)," anyhow?

The laws of each country vary. New Zealand adopted a new and complex copyright law late in 1994 (it went into effect at midnight January 1st) and there are signs in many retail shops that warn you about one or another aspects of the new law. An example, from the local One Hour Photo Shop, reads:

"*Under New Zealand Copyright Law, every photograph has an automatic copyright. We assume that each negative or print you bring to us for copying is in fact your own. Or, if it is not your own, you have obtained the written permission of the owner allowing a copy to be made. This responsibility is yours alone.*"

It all sounds pretty frightening. Just how does that affect satellite programming copyright?

Most modern laws state that it is the duty and responsibility of the copyright owner to clearly post any limitations to "free access and use" of television programming. If they don't want you to view the programming they have two choices:

#1) They can encrypt it to control access

#2) They can 'post an advisory notice' at the beginning (mandatory) and end (optional) of a programme advising that you are not supposed to reuse it in any manner.

This is a private transmission for the exclusive use of CBS Newspath affiliates and subscribers. Any other use of this material without the express written consent of CBS Newspath is prohibited. Unauthorized use violates 47 U.S.C. 705 and is a copyright infringement under the Copyright Law and will be vigorously prosecuted.

CBS announcement: Interestingly, this would only apply in US or in countries with which the US has a reciprocal copyright treaty.

Modern copyright laws further state that if it is not encrypted (in which case your access to it would be via devious encryption busting techniques; you then clearly know you have broken a law!), and, no notice is posted, it is unrestricted for use (and reuse). Modern law also makes the assumption that all responsibility for having cleared copyrights for usage of the material in a telecast has been done by the 'uplinker'. This need for copyright clearance cannot be shifted to you, the viewer.

So was it illegal to tune in the Sun Microsystems Strategy 14 Conference "Live From Moscow" and tape it for a friend? Not at all as there was no notice posted. And what about Vidiplexed transmission on I180 (two separate video programmes on same transponder, interlaced)? Is that encryption. No, it is the same as FTA.

Bottom line? If it is restricted, it must say so (see examples here). If it does not, go for it!

1/ Fortuitous: Due to chance, accidental, casual

これはNHKの
素材伝送用回線です
個人の視聴を
目的としたものではありません
This is the NHK-TV transmission circuit, not for private viewing.

NHK announcement seems clear enough; it may not be correct. If they want to prevent "private viewing" they must encrypt. And if they want to prevent reuse of the material, such as by cable systems, they must say so. In English, this does neither, properly.

SatFACTS PACIFIC OCEAN ORBIT WATCH: 15 July 1995

TR#	IF freq	Gz25/103	G1/130	Gz18/140	G2/142	Gz21/144	P169/Vt	P169/Hz	180/RHC	180/LHC
R6/-1	1,475	DubITV	RAJ(X2)	DubITV	ATN	DubITV				
1	1,430								Keystn	
R7	1,425	Muslim	SunMovies	Muslim	JJAY					
1 - 2	1406/1425						CMT/CBS/d	ABN/CCTV/CTN/d		
3	1,385								VDP	
R8	1,375		ABC-5/d		Cell Fone					
3 - 4	1346/1372						MTV/b	Discov/b		
R9	1,325		AsiaNet		Eagle				MPEG	
6	1,310								MPEG	
6A	1,305									
5 - 6	1288/1300						ESPN/b	OccVid		
R10	1,275		(vacant)		EMTV	DubITV			NBCvdp	
10	1,256								Keyston	
7 - 8	1235/1249						PAS-2	Tests		
R11	1,225		SunMusic		Udaya					
12	1,220								CBS/1	
14	1,175								WNet	
9 - 10	1161/1183						Prime/d	CNN(X2)		
16	1,135								NHK/1	
11 - 12	1110/1115							NHK		
18	1,105								RFO	data
13 - 14	1038/1060						ANBC	FilCh/d	data	Canal +/d
22	1,015								A9/b/c	A9/b/c
15 - 16	998/985						TNT/Ct/b	Data		
23	984								NZ/d	
23A	973								NZ/d	
24	962								TVNZ	

July 1995 NOTES:
/b is B-MAC (NTSC or PAL)
/d is digital
/c indicates some programming is free to air
180 listing includes RHC and LHC polarities
EMTV indicates programming is free to air (FTA)
VDP indicates videoplexed (two video signals, in NTSC format, requiring vidiplex signal separator for proper viewing)
Note: G140 has Ku 11,525 active on northern beam.
PAS-2 indicates reception on 3m or smaller dish in most areas
MTV/b Indicates subscriptions are available (see page 18, SF#10)

Ku BAND ACTIVITY UPDATE

A3B1TR	IF Freq
1(V)	977
5L(V)	1,193
5U(V)	1,218.8
7L(V)	1,344
7U(V)	1,370
10(H)	1,075.75
11(H)	1,138.5

A3/B3:155.9E	B1: 160E
	TAB radio, data
ETV:>0000UTC	Occ.Video,news
	Occ.Video
TVO:>1200UTC	ABC National
	SBS National
B1: Digicipher, Ch.. 0,2,5,6,(7)	
B1: Digicipher, Ch. 0,1,2,5,6,(7)	

PAS2	IF Freq	Coverage Beam	Service Report
1H	981	China 1	
2V	981	NZ/Australia	
4V	1,041	NE Asia	1034: Taiwan
6V	1,101	NZ/Australia	occ. video
7H	1,166	Ch.2 or NZ/Aus	
8V	1,166	NE Asia	
10V	1,231	NZ/Australia	
11H	1,291	Ch.2 or NZ/Aus	
14V	1,351	NZ/Australia	occ. video
15H	1,416	Ch.2 or NZ/Aus	

Ku band data courtesy Robin Colquhoun, Francis Kosmalski (Auckland), Shane Wilson (Mareeba), David Pemberton (Muswellbrook) and others. To contact programmers, see page 18 SF#10. Galaxy B1 (TR10/11H) service presently GI Digicipher 1 format; B3 due on (156E) by August 15. with testing of new Galaxy PACE/Irdeto MPEG format as well as numerous analogue and narrowband services. B1, 11H, has ch. (7) FTA with test card.

-SatFACTS DATA SHOPPE-

YOUR Source For Reference, Study Materials In The World Of Satellite TV

ENTRY LEVEL:

☐ **SATELLITE TELEVISION: All You Need To Know.** Brand new (August 1st) 28 page booklet with four-colour cover designed to help you educate potential customers about the joys of owning a home dish system. Sold through SPACE Dealer Members at NZ$8/A$9 to individuals. Single copies available via fast post within NZ (NZ$10) or elsewhere (US$10) using order form on page 29 here.

☐ TB9402 / **MATV: Master Antenna Television Systems**. How to plan, select equipment for and install multiple outlet systems for motels, hotels, apartment flats and condos. Practical step by step guidance. Price: NZ$20 world-wide.

☐ TB9404 /**Home Satellite Systems**. What the parts are, how they go together for POR home TVRO systems; how you create a working system with maximum performance at minimum outlay. Price: NZ$20 world-wide.

☐ TB9405 / **Commercial Satellite Dish Systems** (SMATV). If you are building a system from scratch, also order TB9402 for the MATV portion basics. If you are rebuilding an existing MATV system to add satellite signals, you need this! Price: NZ$20 world-wide.

■ ALL 3 (TB9402, 9404, 9405) as a package for NZ$40 (you save $20).

DISH OWNING ENTHUSIAST LEVEL:

☐ **Coop's Satellite Operations Manual**. Originally written 1980, this manual explains how you locate and interpret the multitude of wide and narrow band signals available via satellite. Dozens of fun, new ways to get more from your dish system. Price: $NZ30 world-wide.

☐ **Gibson Satellite Navigator** (O/w 1980). The mechanics of the Clarke Orbit Belt, how a dish tracking system is designed and operated to allow full horizon to horizon reception with a motorised dish system. Very practical, very hands on with plenty of do-it-yourself instruction for inexpensive systems. Price: NZ$30 world-wide.

☐ **Coop's Basic Manual on Fine Tuning Satellite Terminals** (O/w 1980). The little things such as feeds, connectors, powering. Tips from the people who started home dish reception in the 1970s, building the foundation for the present TVRO industry day by day, discovery by discovery. Very practical, very hands on. Price: $NZ30 world-wide.

■ ALL 3 (Two from Coop, one Gibson) as a package for NZ$70 (you save $20).

BUSINESS MANAGEMENT REFERENCE MATERIAL:

☐ **CTD 9412 / StarNET TV Wants To Put You In The Cable TV Business.** When AsiaSat 2 is launched this year, StarNET's 7 free to air (plus 35 pay TV) services are designed to make you a cable TV operator. Price: $NZ30 world-wide.

☐ **CTD 9503 / COPYRIGHT - How It Works, Your Liabilities**. Must reading for anyone planning to distribute satellite programming to motels, hotels, communities. Price: NZ$30 world-wide.

☐ **CTD 9504/ GALAXY** - The detailed, inside story of what it is, where it wants to go. If you are hoping for Ku-band DTH in Australia and New Zealand, Galaxy is the most promising programme provider. Price: NZ$30 world-wide.

TO ORDER - USE BOTTOM OF CARD TO RIGHT

SatFACTS JULY 1995 POR OBSERVER REPORTING FORM
(Please FAX [64-9-406-1083] or mail to arrive by 01 August)

TELL US what you are seeing, or using for equipment, that is new within the last 30 days. Observer reports (see "With The Observers" page 22) form an important part of the growing body of information we all share monthly.

• NEW programming sources seen since 1 July: (Please list receiver 'IF' or satellite transponder number if known) ______________________________

____

• CHANGES in reception quality since 1 July: ______________________________

____

• EQUIPMENT changes at my observing terminal since 1 July: ______________________________

____

■ My Name ______________ Address ______________

Town / City ______________ ________ Country ________ **(Please turn form over)**

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☐ Enter my 12 month subscription to SatFACTS Monthly starting with August 1995 issue. My NZ$40 (within New Zealand), **US$40** (outside of New Zealand) is enclosed.

NAME ______________________________

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ADDRESS ______________________________

TOWN / CITY ______________ ________ COUNTRY ______________

Payment and card to: **SatFACTS, PO Box 330, Mangonui, Far North (New Zealand)**

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I wish to order the following reference materials (see description page 30):

☐ **SATELLITES:** All You Need To Know **($10 inside NZ, US$10 elsewhere; description p.17)**
☐ **TB9402 / MATV** (NZ$20; SPACE Members $15).
☐ **TB9404 / Home Satellite** (NZ$20; SPACE Members $15).
☐ **TB9405 / Commercial Satellite** (NZ$20; SPACE $15).
☐ ALL THREE / TB9402, 9404, 9405 (NZ$40; SPACE $30)
☐ **Coop's Satellite Operations** (NZ$30; SPACE $20) .
☐ **Gibson Navigator** (NZ$30; SPACE $20).
☐ **Coop's Basic - Fine Tuning** (NZ$30; SPACE $20).
☐ ALL THREE / OPERATIONS, NAVIGATOR, BASIC (NZ$70; SPACE Members $50).
☐ **CTD 9412 / StarNET Wants To Put You in Cable TV** (NZ$30; SPACE Members $20)
☐ **CTD 9503 / Copyright As It Applies to Satellite Reception** (NZ$30; SPACE Members $20)
☐ **CTD 9504 / GALAXY: The Inside Story** (NZ$30; SPACE Members $20)

Instructions:
☑ Check off items you wish airmailed to you
■ Make cheque to Far North Cablevision Ltd.
■ Complete reverse side of card

- YOUR equipment survey:
  Size dish(es): ____________________; Noise Temp LNB(s): ____________________
  Make/model receiver(s): ____________________
  Make/model standards conversion: ____________________

- Friends with dishes (Will be sent literature explaining SPACE):

____
____
____
____
____
____

If mailing, to: SatFACTS Observers, PO Box 330, Mangonui, Far North, New Zealand

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Joining **SPACE** Pacific is a logical extension of your interest in satellite-direct reception and distribution services. SPACE members enjoy special discounts on publications and materials, receive a membership newsletter, are entitled to first 'pick' for various annual South Pacific Region Satellite & Cable Show functions and lodging. Commercial members of **SPACE** Pacific (there are four levels of membership: You select the one that best suits you) have first choice of exhibit hall spaces at SPRSCS and all members participate in research and development projects to the benefit of the industry. To receive a no-obligation 'Invitation To Join SPACE Pacific', complete and return this card.

My Name ____________________
Company (if applicable) ____________________
Mailing address ____________________
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○ Complete your own ship-to information below.

Total amount of order (add items ordered on reverse side of this card): NZ$________
(If paying in US$, multiply .64 times NZ$ number for total)

Ship to:

Name ____________________

Address ____________________

Town / City ____________________ __________ Country ____________________

IF Member of **SPACE** Pacific: Your membership Number (found on membership certificate, line 4:)____________________